

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
13 January 2005 (13.01.2005)

PCT

(10) International Publication Number
WO 2005/003812 A1

(51) International Patent Classification⁷: **G01S 13/72**

(21) International Application Number:

PCT/GB2004/002703

(22) International Filing Date: 24 June 2004 (24.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0315349.1 1 July 2003 (01.07.2003) GB

(71) Applicant (for all designated States except US): **QINETIQ LIMITED [GB/GB]**; Registered Office, 85 Buckingham Gate, London SW1E 6PD (GB).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **MASKELL, Simon**,

Richard [GB/GB]; QinetiQ Malvern, Malvern Technology Centre, St Andrews Road, Malvern, Worcs. WR14 3PS (GB).

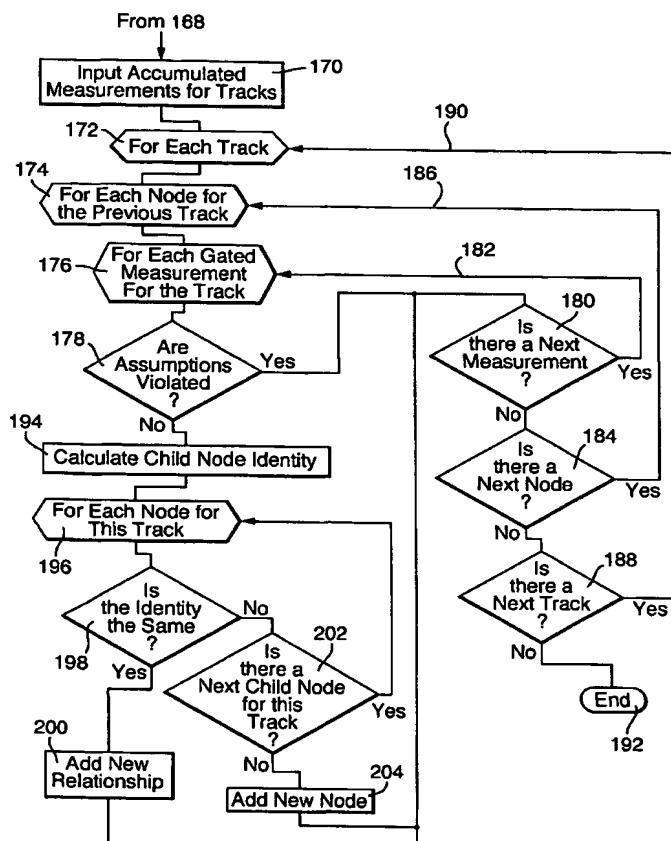
(74) Agent: **A W S WILLIAMS**; QinetiQ Ltd, IP Formalities, Cody Technology Park, A4 Building, Room G016, Ively Road, Farnborough, Hampshire GU14 0LX (GB).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

[Continued on next page]

(54) Title: SIGNAL PROCESSING WITH REDUCED COMBINATORIAL COMPLEXITY



(57) Abstract: Signal processing with reduced combinatorial complexity for tracking evolving phenomena such as radar tracks associated with weighted measurement parameters includes selecting a current phenomenon and obtaining a set of measurement parameters associated with it. Beginning at a start node providing a first parent node having an identity, an identity for a child node of the parent is produced from the set of parameters, the parent identity and a parameter selected from the set and corresponding to the child. This is iterated for other parameters in the set. Child nodes of like identity for the phenomenon are treated as a single node with multiple parameter relationships associated with at least one parent node, whereas child nodes with differing identities are represented as separate nodes. The process is iterated for other phenomena and associated sets of measurement parameters, but child nodes of a previously processed phenomenon are now treated as parent nodes of a phenomenon processed immediately following. Updated sets of parameter weights associated with respective phenomena are derived by iterating over node relationships and identities. This provides a probabilistic assessment of track evolution.

WO 2005/003812 A1



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*